

# PATENT ABSTRACTS OF JAPAN

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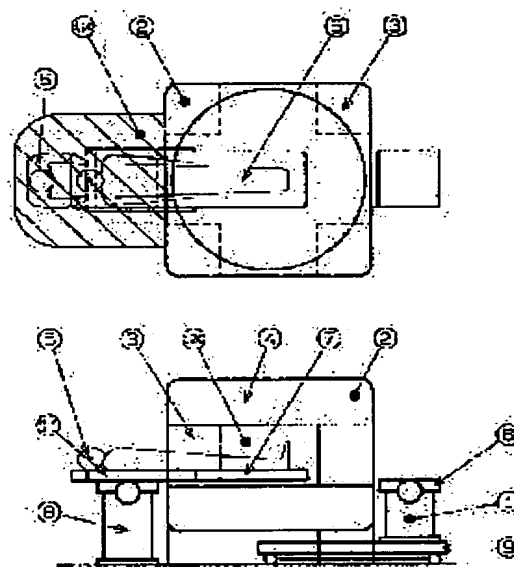
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## (54) OPERATION TABLE DEVICE LINKED WITH MRI DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To perform diagnosing by an image diagnostic device when required by connecting the inspection space of MRI and an operation area and moving a patient matched with an operation purpose by sliding a top plate part.

**SOLUTION:** This operation table device 1 is constituted of the top plate part 7, a column part 8 for supporting the top plate part 7 and a leg base 9 for supporting the column part 8. An MRI device 2 is constituted of a cylindrical magnet 2 and the support 3. Then, the magnetic field of high uniformity is formed and the inspection space 120 is formed at a position capable of obtaining high image quality. The operation table device 1 can be set at the center inside the inspection space 120. That is, the operation table device 1 and the MRI device 2 are rail-connected, the guide mechanism of both is formed and the patient is moved together with the top plate part 7 inside the inspection space 120. Thus, an operation is performed without moving the patient inside the inspection space 120 and MRI diagnosing is performed at appropriate time.



## LEGAL STATUS

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to operating table equipment with the function in which it coordinates with MRI equipment and an operation field can be arbitrarily set up according to the purpose of an operation.

[0002]

[Description of the Prior Art] A doctor diagnoses to a disorder or the illness conventionally, a certain surgical operation is given depending on the case, and postoperative progress is observed. Diagnostic imaging equipments, such as MRI equipment, are used for observation of a diagnosis and progress in such process. Usually, since he undergoes an operation in an operating room, a patient is conveyed in the diagnostic imaging room established in somewhere else after the operation end and observation of progress is performed when conducting a certain surgical operation, postoperative diagnostic imaging has a burden time for the both sides of a patient and a way person, mental, and corporal. Furthermore, when this [ of an operation / unsuitable ] is discovered by the diagnostic imaging after an operation end, a way person and a patient may take the risk of reoperation.

[0003] In recent years, the need for observation of before an operation, into the trap, and the postoperative affected part increases, and MRI equipment (Magnetic Resonance Imaging:nuclear-magnetic-resonance picture equipment) is put in practical use as the effective means. In the conventional operating room environment, since a surgical instrument, operating table equipment, etc. which are influenced by the powerful magnetic field generated from MRI equipment have various problems in high magnetic field environment, the operating room and the diagnostic imaging room are established in the space separated separately.

[0004]

[Problem(s) to be Solved by the Invention] When diagnostic imaging is needed the embodiment of an operating table which has the structure which can set up a patient's posture corresponding to the operation purpose, and can be applied to MRI equipment, and during an operation, working efficiency, such as a safety aspect [ as opposed to the patient from a \*\*\*\*\* in a patient's mileage between services ] and also a way person, and a nurse, is bad, and is taken up as a problem that the improvement is big. Moreover, the trouble which should solve many, such as a deployment of a floor space, also from the aspect of practical use of medical facilities can be considered.

[0005] In this invention, taking the above-mentioned trouble into consideration, when the diagnosis by diagnostic imaging equipment is required during a certain surgical operation, it aims at offering the operating table equipment which can diagnose to timely.

[0006]

[Means for Solving the Problem] The operating table equipment by this invention is equipped with the function to in\_ which a patient's posture can be set up in accordance with the purpose of an operation in the limited interior of a room, and approaches the inspection space in MRI equipment, and this inspection space, and solves the above-mentioned technical problem with operating table equipment equipped with a conveyance means connect the operation field installed in the arbitrary positions which were adapted for the operation purpose. It has the function which the top-plate section of the above-mentioned operating table equipment slides, the top-plate section penetrates the inside of the inspection space of MRI equipment, and the above-mentioned technical problem is solved by means to convey to the operation space in which the patient was prepared out of MRI equipment. Moreover, it has the function which the top-plate section of operating table equipment slides, and the inspection space of MRI equipment is penetrated, and the top-plate section and the column section dissociate and solve the above-mentioned technical problem by means to equip the 2nd column section currently beforehand installed in the position which faces.

[0008] Operating table equipment solves a technical problem according to structure applicable to the high magnetic field environment generated from the MRI equipment which is diagnostic imaging equipment.

[0009]

[Embodiments of the Invention] The gestalt of operation of this invention is explained with reference to a drawing below. Drawing 1 shows the conceptual diagram of the operation field 110 which can be set as the operation space

100 in an operating room, the inspection space 120 by the MRI equipment formed in operation space, and the arbitrary positions applied to the operation purpose. By the conveyance means of 110 operating-table equipment, the operation field which performs the inspection space 120 and surgical treatment by MRI equipment coordinates effectively, and can inspect during an operation timely. In this case, the operation field 110 is set as the place where the inside of MRI equipment and MRI equipment approach. This operation field 110 can perform a position-setup by the operation to apply. It may be determined by the layout of an operating room. Furthermore, operating table equipment can move the excursion of this operating table equipment to arbitrary places along with the guide of a rail by installing guide functions, such as a rail, in a floor line, and installing the receptacle section of this rail in operating table equipment so that it may not interfere in other equipments with which it is already installed in the operating room. Moreover, it can constitute as a guide function using a magnetic guide tape laser beam etc. The source of power is easy for carrying out the load of the auxiliary power or the run type power function by the help or the motor. Furthermore, it cannot be overemphasized that various methods, such as position control by electric remote control operation and position control by the computer which comes out automatically, can be considered.

[0010] Drawing 2 shows the example equipped with the operating table equipment 1 which put the patient 5 on the inspection space 120 of open type (opening is prepared in the gantry section 12 of MRI equipment) MRI equipment 2. Operating table equipment 1 consists of \*\*\*\* 9 supporting the top-plate section 7, the column section 8 supporting a top plate, and the column section. Open type MRI equipment 2 consists of four supports 3 supporting the magnet 2 which generates the MAG and the magnet of a cylindrical shape of a cylindrical shape. The homogeneity of a magnetic field is high and the position where high quality of image is obtained is used as inspection space 120. Therefore, without operating table equipment's 1 consisting of structure which can be set as the center position in the inspection space 120 of this MRI equipment 2, and moving a patient 5 in the inspection space 120 in this case, it is constituted so that the way person 6 can perform an operation, and it can inspect during an operation timely.

[0011] Operating table equipment 1 has the structure with which MRI equipment 2 can be equipped with a sufficient precision as like where the position of a patient's 5 affected part comes to the center in the inspection space 120. Drawing 3 shows the example of the guide function to equip with operating table equipment. For example, the rail receptacle section 13 is formed in \*\*\*\* of operating table equipment, still more nearly another rail 14 in the lower part of MRI equipment 2 is constituted, and the position of MRI equipment 2 and operating table equipment is clearly conveyed by combining both rail receptacle section 13 of operating table equipment, and rail 14 of MRI equipment. The example shown above is what showed the guide function of MRI equipment and operating table equipment, and operating table equipment can move it to arbitrary places along with the guide of a rail by [ in which the guide function of operating table equipment and an indoor floor line can also have the same function as the above ] installing the guide of a rail in a floor line, and, for example, installing the receptacle section of this rail in operating table equipment. Moreover, a guide function consists of heights of a rail, and a crevice which receives the rail, and each position can be controlled by combining arbitrarily MRI equipment 2, operating table equipment 1, and an indoor floor line.

[0012] Drawing 4 shows the example in the case of a patient's 5 affected part being outside the inspection space 120 of MRI equipment 1, and undergoing an operation out of the inspection space 120. When the top-plate section 7 of operating table equipment penetrates and slides the inside of the inspection space 120 of the MRI section to a longitudinal direction, a patient 5 can be made to be able to convey outside the inspection space 120 of MRI, and the way person 6 can perform an operation in the position. That is, it is the example which approached and installed the operation field 110 in the inspection space 120, therefore can inspect during an operation timely by the slide function of the top-plate section 7 of operating table equipment 2.

[0013] The top-plate section 7 which shows the slide function of the top-plate section 7 of operating table equipment to drawing 5 consists of up top-plate 7a and lower top-plate 7b, and while inspecting in MRI equipment 2, the patient 5 is on up top-plate 7a in the state where up top-plate 7a and lower top-plate 7b have lapped. Furthermore, when performing an inspection defensive hand way, while only up top-plate 7a had picked up the patient 5, it can convey besides MRI equipment 2, and an operation is possible in the operation field 110 installed in the position. Therefore, it can inspect during an operation timely by the slide function of the top-plate section 7 of operating table equipment 2.

[0014] Drawing 6 shows another example on which a patient's 5 affected part is outside the inspection space 120 of MRI equipment 2, and an operation can be performed out of the inspection space 120. The example of above-mentioned drawing 6 is explained based on the conveyance method shown in drawing 8, drawing 9, and drawing 10. For example, drawing 8 shows the state where it is inspecting with MRI equipment 2. after resembling drawing 9, setting and the top-plate section 7 and the column 8 of operating table equipment 1 dissociating, only the top-plate section 7 which picked up the patient 3 slides to a longitudinal direction, and penetrates the inside of the inspection space of MRI equipment Then, the top-plate receptacle section 11 of the 2nd column 10 installed beforehand is equipped automatically. then, drawing 10 -- being shown -- \*\* -- a patient is made to convey to the

operation field prepared outside the inspection space of MRI equipment 2 like It can realize now very easily by introducing the conveyance function of operating table equipment 1 in which the diagnostic imaging into the trap which required the time and effort of the former many, and had a problem in a patient's safety can inspect easily. [0015] Independently, when latus space is required, the example constituted so that the influence of a magnetic field might install the operation field 110 in a few place from MRI equipment 2, a patient 5 might be conveyed and an operation might be conducted is indicated to be the operation conducted by penetrating the aforementioned MRI equipment to drawing 7 . Moreover, in order to avoid applying to an operation case and placing a patient into a magnetic field for a long time, the influence of a magnetic field can make a patient convey to the few operation field 110 by moving operating table equipment to the longitudinal direction of operating table equipment 1 operating table, and making it rotate and fix to arbitrary angles centering on a column from MRI equipment 2 in the position as the conveyance method for separating from the above-mentioned MRI equipment 2 beyond a fixed distance. As described above also in this case, conveyance of operating table equipment can be performed by the guide function of operating table equipment.

[0016] Drawing 11 , and 12 and 13 show the plot plan of the support (a magnetic path is constituted) which is what showed the fundamental structure of the open type MRI equipment put in practical use now, and supports a magnet. Here, reference is not made about the performance of the main part of MRI equipment. Type 1 is shown, the support 3 which constitutes the magnetic path of MRI equipment consists of \*\*\*\*\* , and drawing 11 has the structure where the conveyance means of operating table equipment is not limited comparatively. Drawing 12 shows Type 2 and the support 3 mentioned above consists of two. Drawing 13 shows Type 3 and the support 3 mentioned above consists of four. The conveyance method of Type 3 has already described the example. The lengthwise method to slide is shown in drawing 14 to the longitudinal direction of operating table equipment 1 as the method, i.e., the conveyance approach method, of conveying operating table equipment to MRI equipment. This method can respond to the MRI equipment of all said types. Moreover, the conveyance approach method shows the lateral method of sliding to drawing 15 to the longitudinal direction of operating table equipment 1. In Types 1 and 2 of MRI equipment, this method is applicable. Moreover, the conveyance approach method shown in drawing 16 shows how to rotate and fix to arbitrary angles centering on the column section of operating table equipment 1. In Types 1 and 2 of MRI equipment, this method is applicable. As described above also in this case, conveyance of operating table equipment can be performed by the guide function of operating table equipment. If the conveyance approach methods mentioned above are Types 1 and 2 of MRI equipment, three kinds of conveyance methods are possible, and Type 3 of MRI equipment can take the slide to lengthwise, and the conveyance gestalt which already described and was explained. Therefore, it is possible to combine the approach method of operating table equipment 1 arbitrarily to various kinds of MRI equipments, and the operation space 100 in the limited operating room can be used efficiently.

[0017] Operating table equipment 1 mainly consists of material with high non-conducting with nonmagnetic [ high and ], such as the material which does not have influence (artifact) detrimental to the diagnostic imaging result by MRI equipment 2, for example, a resin etc., for the top-plate section 7. Therefore, the high operation of positive diagnostic imaging and safety is attained.

[0018] In addition, the operation function of operating table equipment is shown in drawing 17 . The operation function of the top plate of operating table equipment has a rise-and-fall function, a sideslip, vertical turning point ability, and a slide function so that arbitrary posture can set up a patient according to the purpose of an operation.

[0019] [Effect of the Invention] Since according to this invention he undergoes an operation, observing a picture, and the positive high operation of precision can be performed and safety with the higher operation itself becomes possible by performing the diagnostic imaging by MRI to timely in case he undergoes an operation, a way person's mental burden is mitigated sharply.

[0020] According to this invention, by performing the diagnostic imaging by MRI to timely into the trap, since the check work of an operation result becomes unnecessary anew after an operation, the time and corporal burden of a doctor and a patient is lost.

[0021] According to this invention, by establishing the inspection space by MRI equipment in the operation field in the operation space on which an operation is performed, operation and inspection are conducted by a series of flows in the limited indoor small space, and things are made. Therefore, the efficiency of an operation is improved sharply. Furthermore, since operation and inspection are conducted by a series of flows, a staff's curtailment is expected.

[0022] According to this invention, institution costs are sharply cut down by communalization of operation space and inspection space for the formation of a small space in medical facilities.

[0023] By using the conveyance means of the operating table equipment by this invention, interference with other facilities beforehand installed on the occasion of the operation can be avoided, and an operation can carry out to safety efficiently more.

[0024] As mentioned above, according to this invention, drastic curtailment of total-medical expenses is expected

with a patient's security according to the effect mentioned above.

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[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] MRI equipment correspondence operating room

[Drawing 2] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 3] Guide symbol description view

[Drawing 4] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 5] Explanatory drawing of a slide of the top-plate section of operating table equipment

[Drawing 6] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 7] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 8] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 9] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 10] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 11] The plot plan of the support of MRI equipment

[Drawing 12] The plot plan of the support of MRI equipment

[Drawing 13] The plot plan of the support of MRI equipment

[Drawing 14] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 15] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 16] Explanatory drawing of the conveyance method example of operating table equipment

[Drawing 17] The operation symbol description view of the top-plate section of operating table equipment

[Description of Notations]

1 Operating Table Equipment

2 MRI Equipment

3 Support

4 Magnet

5 Patient

6 Way Person

7 Top-Plate Section

7a Up top-plate section

7b Lower top-plate section

8 Column Section

9 \*\*\*\*

10 2nd Column Section

11 Top-Plate Receptacle Section

12 Gantry of MRI Equipment

13 Rail Receptacle Section

14 Rail

100 Operation Space

110 Operation Field

120 Inspection Space

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**CLAIMS**

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[Claim(s)]

[Claim 1] The operating table equipment which the diagnostic imaging of the patient by MRI equipment carries out [ having constituted so that timely may be carried out, and ] as the feature during an operation through the conveyance means and this conveyance means of the above-mentioned operating table to which the operation field installed in the arbitrary positions where the operating table and the operating table which have the function which a patient's posture can set up arbitrarily according to the purpose of an operation approached the inspection space and this inspection space in MRI equipment, and are adapted for the operation purpose connects. [Claim 2] Operating table equipment characterized by having the function which the top-plate section of operating table equipment slides to a conveyance means, and for this top-plate section penetrating the inside of inspection space, and moving. [Claim 3] Operating table equipment which is equipped with the function which the top-plate section and the column section of operating table equipment separate and slide, this top-plate section penetrates the inside of the above-mentioned inspection space, moves, and is characterized by setting up so that it may combine with the 2nd column section installed in the position which faces and the top-plate section can be maintained. [Claim 4] Operating table equipment characterized by having the function which an operating table can circle in which and set as a conveyance means in the arbitrary directions to MRI equipment. [Claim 5] Operating table equipment characterized by having the function in which operating table equipment carries out a horizontal slide, and which it can set as a conveyance means perpendicularly to the longitudinal direction of an operating table to MRI equipment. [Claim 6] Operating table equipment characterized by being applicable to the high magnetic field environment generated from MRI equipment. [Claim 7] Operating table equipment characterized by having the structure where the patient posture for which it asks corresponding to the measurement position in inspection space can be set up.

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[Translation done.]



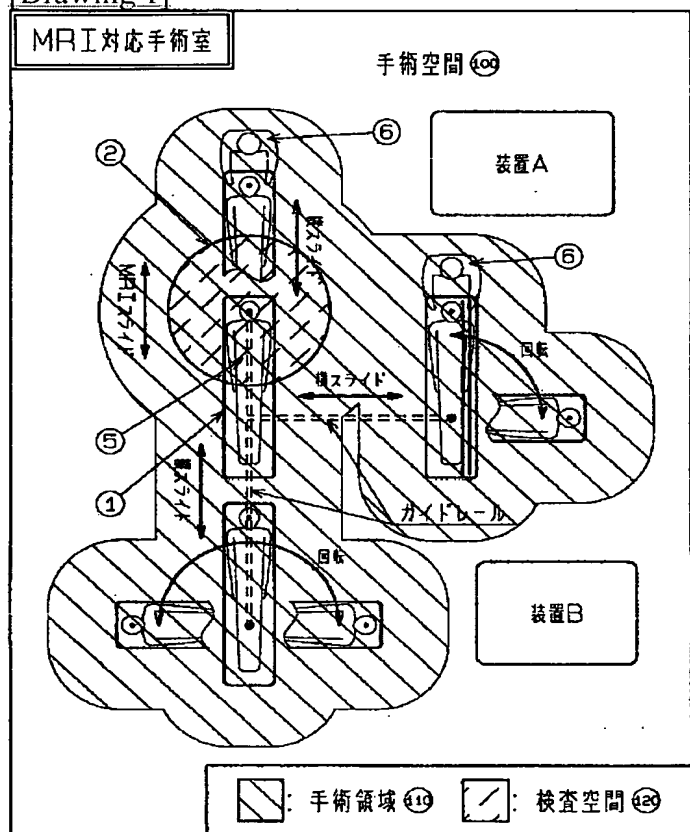
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DRAWINGS

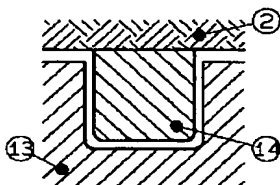
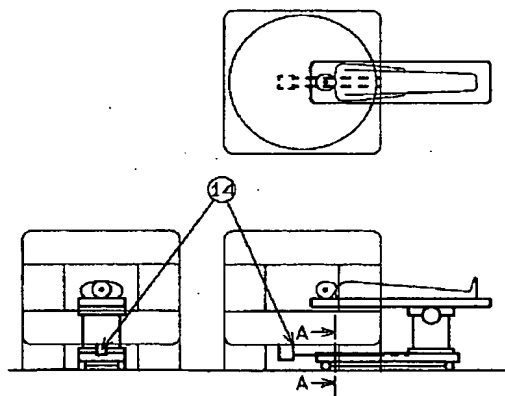
[Drawing 1]



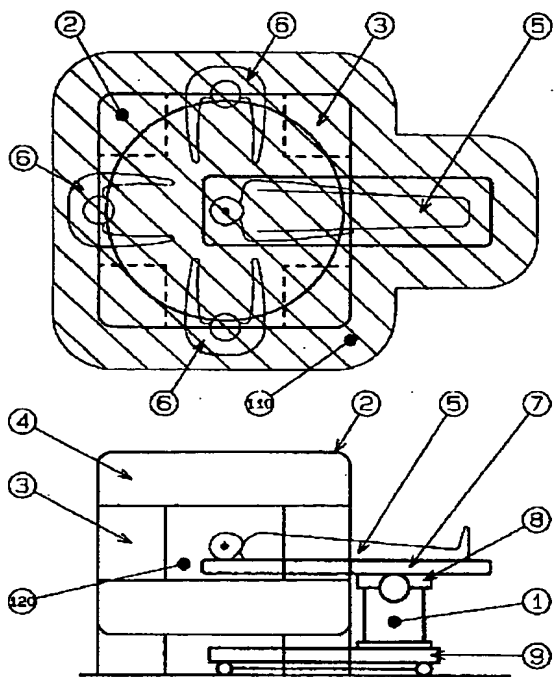
[Drawing 2]

【図2】

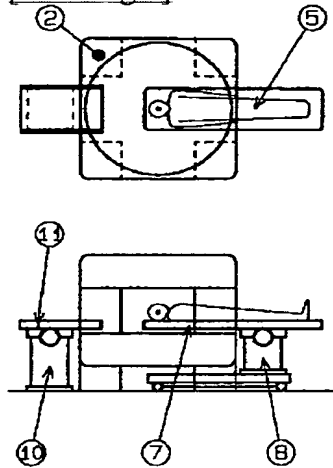
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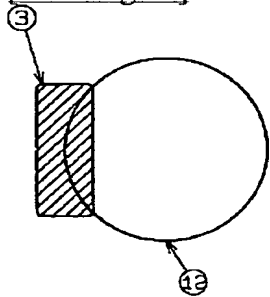
[Drawing 3]



[Drawing 8]



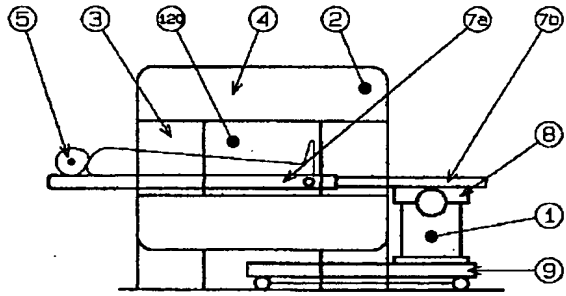
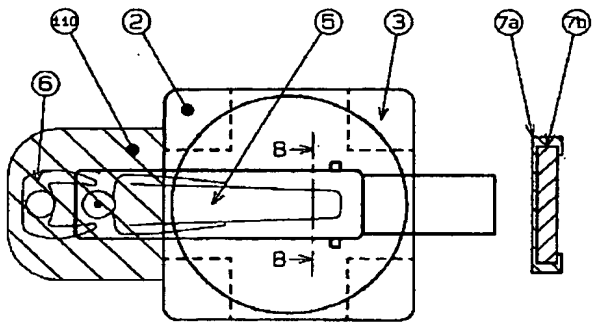
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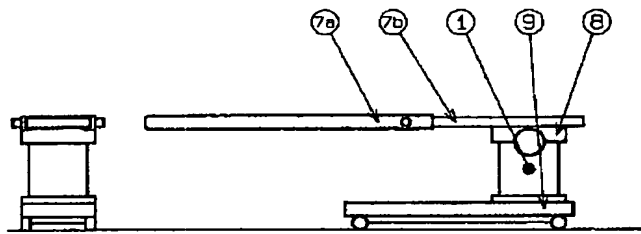
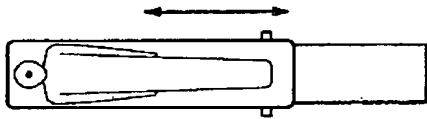
[Drawing 4]

B-B断面

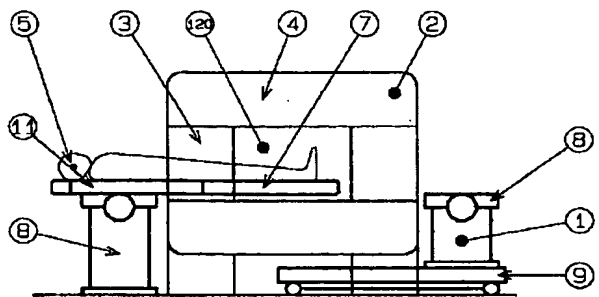
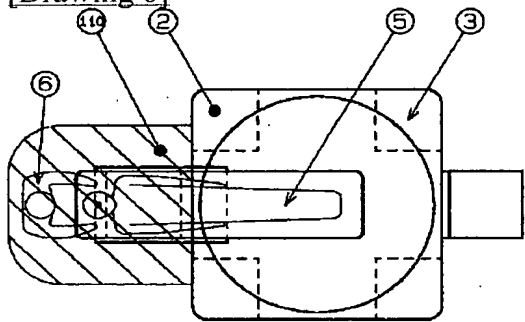
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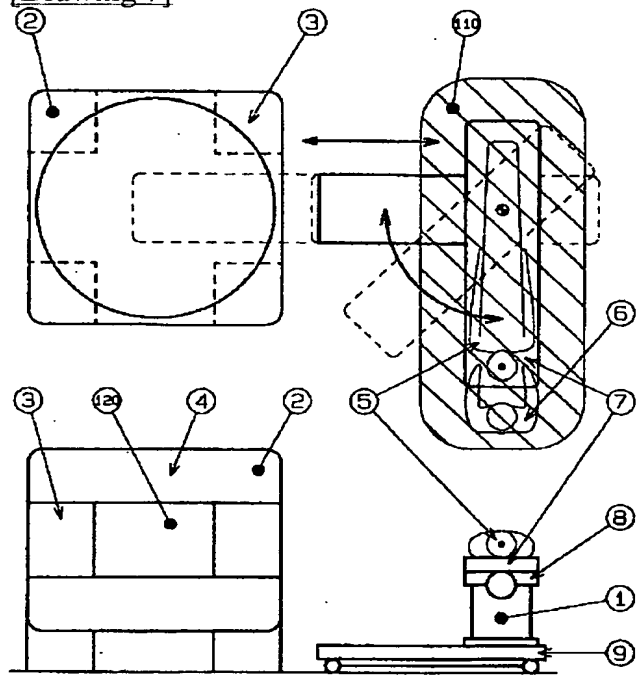
[Drawing 5]



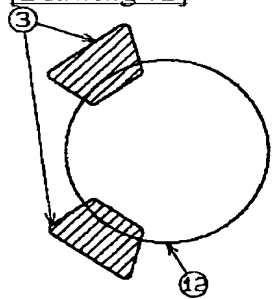
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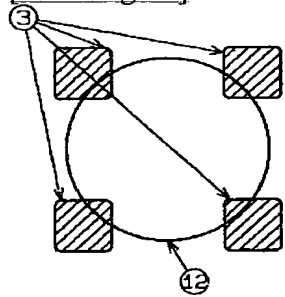
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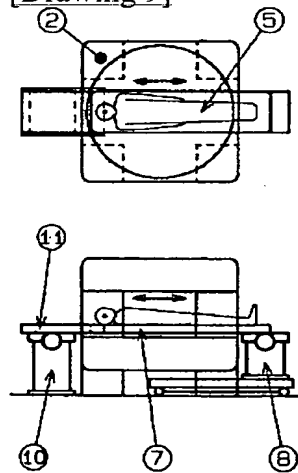
[Drawing 12]



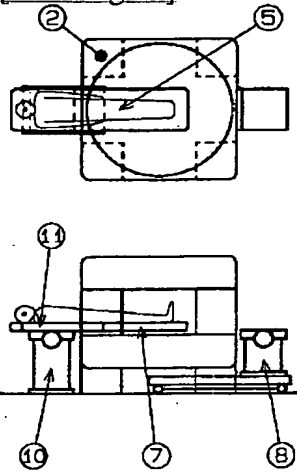
[Drawing 13]



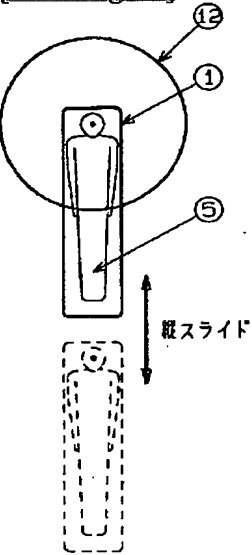
[Drawing 9]



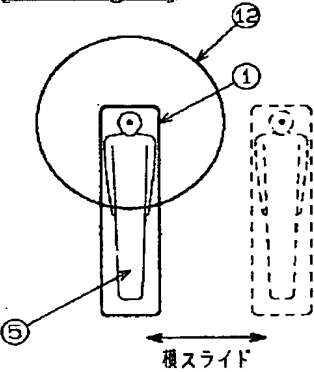
[Drawing 10]



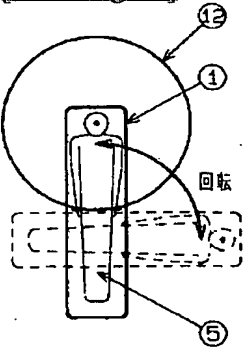
[Drawing 14]



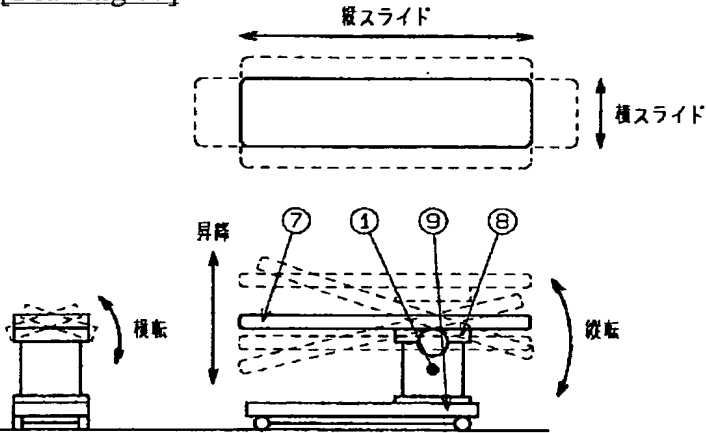
[Drawing 15]



[Drawing 16]



[Drawing 17]



[Translation done.]